

REMARKS

Claims 1-10, 13, and 15-33 were pending in the above-identified application when last examined and stand rejected.

Claims 1, 2, 7-9, 13, 15-18, and 22-33 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Pat. No. 6,552,555 (Nuytkens). Applicant respectfully traverses the rejection.

Independent claim 1 distinguishes over Nuytkens at least by reciting, "a probe comprising a semiconductor die and probe tips on the semiconductor die." Nuytkens fails to disclose or suggest probe tips on a semiconductor die.

In applying Nuytkens to claim 1, the Examiner stated, "Nuytkens et al. discloses (fig. 1 and 2) a probing system ... comprising a probe (30a) comprising a semiconductor die 32 and probe tips (46) on the semiconductor die (32)." However, Nuytkens beginning at column 5, line 46 states, "The probe unit 30a includes a printed circuit board (PCB) 32." Nuytkens then describes a system having probe tips on printed circuit board 32, not on a semiconductor die.

Applicant notes that Figs. 4 and 5 of Nuytkens show probe portions of integrated circuit testing apparatuses including a substrate 52 disposed adjacent a flexible member 50 and a PCB 32. Nuytkens at column 6, line 26 states, "The substrate 52 can be any planar non-compressive substrate, for example, a ceramic or semiconductor substrate." However, even in the embodiments of Figs. 4 and 5, flexible probe tips 46 are on PCB 32 as described above, not on substrate 52.

Claim 1 further distinguishes over Nuytkens by reciting, "the probe tips being affixed to the semiconductor die so that the pattern of the probe tips expands/contracts with thermal expansion/contraction of the semiconductor die." As noted above, Nuytkens describes probe tips 46 on a PCB 32 and fails to suggest that the pattern of the probe tips 46 would expand or contract with thermal expansion or contraction of a semiconductor die, instead the pattern of probe tips 46 expand or contract with PCB 32.

In accordance with an aspect of the current invention, test equipment can include probe tips on a semiconductor die that has thermal characteristics that are similar or identical to a semiconductor device being tested. Accordingly, the pattern of probe tips can continue to match the pattern of terminals on a device being tested even when there are large variations in the test temperatures. Nuytkens describes use of semiconductor material as an example of a

non-compressive material, but Nuytkens fails to suggest putting probe tips on a semiconductor in order to match thermal properties of the probe and the device. Accordingly, claim 1 is patentable over Nuytkens.

Claims 2, 7-10, and 29-33 depend from claim 1 and are patentable over Nuytkens for at least the same reasons that claim 1 is patentable over Nuytkens.

Claim 32 further distinguishes over Nuytkens by reciting, "the semiconductor die is substantially identical to the device." Nuytkens fails to suggest probes containing structures that are substantially identical to a device being tested. In particular, Nuytkens fails to suggest any resemblance between the device being tested and PCB 32 or substrate 52.

Claim 33 further distinguishes over Nuytkens by reciting, "the bumps are of a type suitable for use in a flip-chip package." Nuytkens describes structures including elastic bumps as probe tips, and Nuytkens fails to suggest that such bumps would be suitable for use in a flip-chip package.

Independent claim 13 distinguishes over Nuytkens at least by reciting, "forming probe tips on a semiconductor die." As noted above, Nuytkens describes probe tips 46 that are on a PCB 32. In regard to a manufacturing method, Nuytkens beginning at column 3, line 2 describes, "The method includes the steps of: a) providing a printed circuit board (PCB); b) forming an conductive elastic material; and c) disposing the conductive elastic material on a surface of the PCB to form a plurality of bumps." Nuytkens beginning at column 3, line 59 further states, "the method further comprises the step of disposing a substrate on a surface of the PCB away from the surface having the bumps. The substrate can be a ceramic or a semiconductor substrate." Nuytkens fails to suggest forming probe tips on a semiconductor die. Accordingly, claim 13 is patentable over Nuytkens.

Claims 15-28 depend from claim 13 and are patentable over Nuytkens for at least the same reasons that claim 13 is patentable over Nuytkens.

For the above reasons, Applicant requests reconsideration and withdrawal of the rejection under 35 U.S.C. § 102.

Claims 3-6 and 10 were rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Nuytkens in view of U.S. Pat. No. 5,804,983 (Nakajima). Applicant respectfully traverses the rejection.

Claim 3-6 and 10 depend from claim 1, which is patentable over Nuytkens for at least the reasons given above. In particular, Nuytkens discloses probe tips on a PCB 32 but fails to

disclose or suggest probe tips on a semiconductor die. The Examiner cites Nakajima for disclosing "a probe card 22 including a receptacle" and for disclosing a positioning system. However, combining such teachings with Nuytkens fails to suggest, "a probe comprising a semiconductor die and probe tips on the semiconductor die" as recited in claim 1. Accordingly, claim 1 and claims 3-6 and 10, which depend from claim 1, are patentable over the combination of Nuytkens and Nakajima.

For the above reasons, Applicant requests reconsideration and withdrawal of this rejection under 35 U.S.C. § 103.

Claims 19-21 were rejected under 35 U.S.C. § 103(a) as unpatentable over Nuytkens in view of U.S. Pat. No. 5,513,430 (Yanof). Applicant respectfully traverses the rejection.

Claims 19-21 depend from claim 13, which is patentable over Nuytkens for at least the reasons given above. In particular, Nuytkens fails to disclose or suggest, "forming probe tips on a semiconductor die" as recited in claim 13. The Examiner cites Yanof for disclosing particular methods for forming holes. However, such a teaching when considered in combination with Nuytkens still fails to suggest, "forming probe tips on a semiconductor die." Accordingly, claim 13 and claims 19-21, which depend from claim 13, are patentable over the combination of Nuytkens and Yanof.

For the above reasons, Applicant requests reconsideration and withdrawal of this rejection under 35 U.S.C. § 103.

In summary, claims 1-10, 13, and 15-33 were pending in the application. This response amends claim 1 and leaves claims 2-10, 13, and 15-33 in the form previously examined. For the above reasons, Applicant respectfully requests allowance of the application including claims 1-10, 13, and 15-33.

Please contact the undersigned attorney at (408) 927-6700 if there are any questions concerning the application or this document.

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Respectfully submitted,



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